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The dynamic changes of psychosomatic symptoms in three waves of COVID-19 outbreak and fatigue caused by enduring pandemic in China

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ABSTRACT

Background: Two years have passed since the 2019 novel coronavirus disease (COVID-19) was first reported. The persistent pandemic might lead to severe psychosomatic problems and fatigue. In addition, the recent rapid rising COVID-19 cases in China have become a trending issue. Therefore, this study aimed to investigate the dynamic changes in psychosomatic problems at the initial and current stages of the pandemic.

Methods: Three waves of cross-sectional online survey were conducted during the initial COVID outbreak in China. The psychosomatic symptom scale (PSSS), perceived stress scale (PSS), and pandemic fatigue scale (PFS) were used to assess the psychosomatic problems, stress, and fatigue.

Results: 4317, 1096, and 2172 participants completed the first, second, and third surveys. The prevalence of psychosomatic disorder was 22 %, 28 %, and 39 %, respectively. The network structure of PSSS symptoms has not significantly changed as the pandemic progresses. However, the global strength of the PSSS networks, indicating the overall connectivity, in the third wave was significantly higher than in the first wave ($s = 0.54$, $P = 0.007$). The most central symptoms in the first and third wave networks were depressed mood and tiredness. The PFS score was higher in the people concerned with indirect impact than those concerned with health ($P < 0.001$). PFS has positive relationships with PSSS and PSS score ($R = 0.41$, $P < 0.001$ and $R = 0.35$, $P < 0.001$, respectively).

Conclusions: The persistence of the pandemic caused critical psychosomatic issues, stress, and indirect burden over time, leading to inevitable fatigue. People endured needing immediate attention to prevent or reduce psychosomatic disorders.

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1. Introduction

In December 2019, novel coronavirus pneumonia (COVID-19) caused widespread infections in Wuhan (Zhu et al., 2020). The number of reported cases has rapidly increased worldwide and quickly garnered attention (Cohen and Normile, 2020). The World Health Organization (WHO) responded promptly to the outbreak and declared the disease a "Public Health Emergency of International Concern" on January 30, 2020. Entering the third year of the pandemic, over 514 million confirmed cases and over six million deaths had been reported (World Health Organization website). COVID-19 has been under good control for the past two years in China. However, recently, rapidly growing cases reported in Shanghai indicate that fighting against COVID-19 can be more extended than expected. Clarifying the impact of the persistent pandemic on mental health and revealing people's attitudes towards this recent outbreak is critical.

COVID-19 remains a direct public health threat. Geriatric populations and those with existing medical conditions are more likely to face severe illnesses, death, and extra medical resource (Lu et al., 2020; Ryu and Chun, 2020; Wang et al., 2020b; Wang et al., 2020c; Wu, 2020). Although the characteristics of SARS-CoV-2 variants have been detailed and understood, there are no specific treatments. In addition, the sequelae of COVID-19 have been well studied with long term consequences, which adds to the burden and uncertainty. Social distancing, hygienic regulations, and vaccines remain the most effective protective methods. Besides COVID-19 itself, such behavioral regulations and guidelines inevitably influence almost every aspect of people's lives. Taken together, the direct and indirect influence of COVID-19 has caused enormous stress and leads to adverse mental health outcomes (Wu et al., 2021).

Studies showed that the global population is under extremely stressful conditions resulting in a higher risk of developing anxiety and depression during COVID-19 outbreaks (Yang et al., 2020). General population and medical health workers had high prevalence of insomnia, anxiety, depression, somatization, and obsessive-compulsive symptoms (Li et al., 2021; Zhang et al., 2020), especially for women, young, physical disability and peoples with poor sleep quality (Huang and Zhao, 2021; Steptoe and Di Gessa, 2021). Following meta-analysis showed that the prevalence of depression, anxiety and sleeping disturbances was 45 %, 47 %, and 34 % (Deng et al., 2021). Another meta-analysis concerning the incidence of mental health in different countries displayed that anxiety was 33.33 % in China and 47.70 % in other countries (Italy, Turkey, and India). The average prevalence of depression was 34.31 % and a sub-group analysis showed that depression was higher in China (36.32 %) than in other countries (28.3 %) (Necho et al., 2021). Given that prior studies and reviews relied largely on one cross-sectional studies, a longitudinal research of more compelling evidence for the mental health effects is needed. A study found that 10 % experienced a clinically significant increase in psychopathological symptoms from pre to post-outbreak assessment (Schäfer et al., 2020). In view of this, COVID-19 brings common and serious psychological problems. Furthermore, it posited that a late mental health crisis would develop due to the physical consequences of COVID-19 itself and the ensuing lack of care due to the collapse of health systems. Therefore, mental health researchers have to be prepared for the late effects of the pandemic to come (Lestari and Setyawan, 2021). So multi-wave surveys were urgent to conduct and observe the dynamic changes of psychosomatic problems.

Returning to a "normal" life remains challenging even with the vast application of vaccines, and growing fatigue is inevitable. This unexpected and prolonged pandemic would further deteriorate the population's mental health and capacity to cope with the situation, thereby leading to psychological fatigue (PF) (Yu et al., 2020). It has supposed to be a natural psychological response of individuals by over-exposition to negative pandemic-related information and the repetitive implementation of behavioral constraints (World Health Organization website). Many people have responded to the chronic public health crisis with a psychological response characterized by a general negative attitude and less motivation regarding the adoption of protective behaviors. PF is related to a diminution of the adoption of individual protective behaviors, which leads to a prolongation of the pandemic situation (Ilesanmi et al., 2020).

This study aimed to investigate the dynamic changes in psychosomatic symptoms and perceived stress between the early and current stages of COVID-19. In addition, We also aimed to reveal the pandemic's effects on life and related fatigue nowadays. The first two waves of survey were conducted during the initial outbreaks of Wuhan, while the third wave was in the recent upgoing phase of the outbreak of Shanghai. We hope this study will help understand the trajectory of people's mental suffering and attitude towards this persistent pandemic, and further adjustment and intervention can be deployed.

2. Methods

2.1. Study design and participants

The current study is a cross-sectional online survey conducted by the Chinese Society of Psychosomatic Medicine (CSPM) from Feb 3, 2020 to Feb 11, 2020 (first wave), Mar 7, 2020 to Mar 16, 2020 (second wave) and April 1, 2022 to April 8, 2022 (third wave) in China. A total of 7585 participants completed the survey (4317 in the first wave, 1096 in the second wave, 2172 in the third wave). The relationship between the time points of three wave investigations and the pandemic situation at that time is shown in Fig. 1. Data were collected via the WeChat based Questionnaire Star (Changsha Renxing Science and Technology, Shanghai, China) using a snowball sampling method. The participants with dementia, hemianopia, severe disease severely impacting their ability to finish the survey were removed, we maintained all participants for a true reflection of the population. All participants were required to provide written informed consent. The Medical Ethical Committee approved this study of ZhongDa Hospital of Southeast University (approval number 2020ZDSYLL011-P01). The protocol for this research project is conformed to the provisions of the Declaration of Helsinki.

2.2. Outcomes and instruments

We focused on the dynamic changes of psychosomatic symptoms in three waves of COVID-19 outbreak, pandemic fatigue and the relationship with psychosomatic symptoms in the third wave. Accordingly, psychosomatic problems were assessed by the psychosomatic symptom scale (PSSS, supplementary materials Table S1) (Li et al., 2020). The PSSS, developed by CSPM with high reliability and validity, included 26 items with somatic and psychological factors. Cut-off values of 11 in females and 10 in males are considered to be "confirmed psychosomatic problems".

The perception of stress during the COVID-19 outbreak was measured by the Chinese version perceived stress scale (PSS) (Wang et al., 2011). The scale included two dimensions of negative feelings and positive feelings, and had satisfactory psychometric properties. PSS total scores of 24 are considered to be high perceived pressure.

Brief pandemic fatigue scale (PFS) was used to estimate psychological response of pandemic fatigue on individuals (Cuadrado et al., 2021). It may affect the adoption of protective measure to avoid catching and spreading the virus. It also include two subfactors of information fatigue and behavioral fatigue. In the third wave, we add this scale because the pandemic lasted nearly three years. This scale was translated to Chinese version by two physicians (WH Jiang and YY Yue) independently and then proofread by professor Yuan. The last item was the opposite question because of the sensitivity. In order to find the cause of PFS, we also add two questions to ask about the impact and concern of this pandemic on people's lives (health, economy, interpersonal communication, family relations and entertainment).

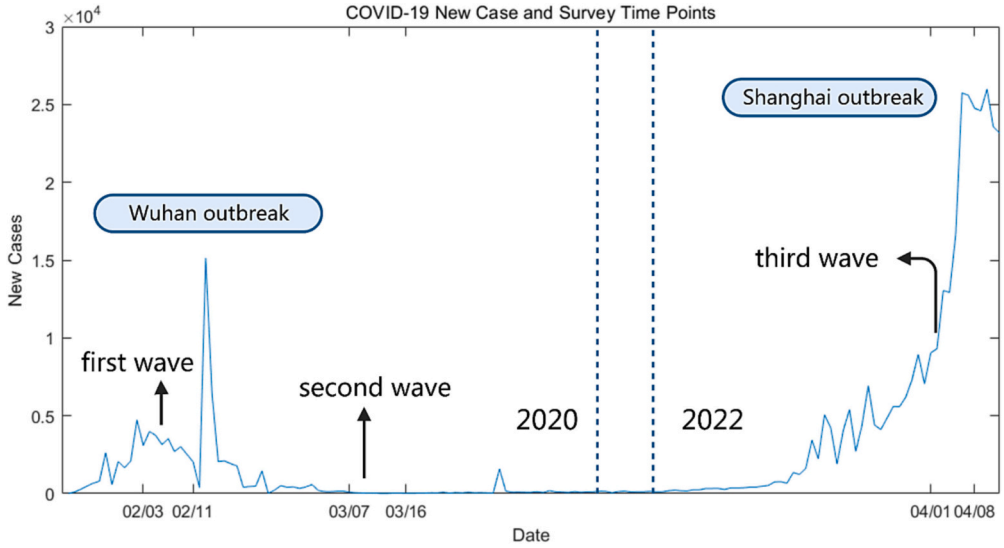

Fig. 1. Schematic diagram of investigation time point and pandemic situation.

The socio-demographic contains age, gender, regions, COVID-risk stage, health status, marital status, job, and education. The participants were divided into three stages (mild, moderate, and severe) according to the COVID risk and the existing threat to the population. The severe risk population included confirmed cases, medical workers (including physicians and nurses), management and control personnel with COVID-19, and related community volunteers. The moderate-risk population included suspected cases, personnel currently at home in quarantine, and the close relatives of the above populations. The mild risk population indicated the general population.

2.3. Statistical analysis

The data analyses were performed by R 4.1.3, a free software environment for statistical computing and graphics (R Core Team, Vienna, Austria, https://www.R-project.org). The bootnet package v1.5 (https://CRAN.R-project.org/package=bootnet) (Epskamp et al., 2018), and the Network Comparison Test package v2.2.1 (https://CRAN.R-project.org/package=NetworkComparisonTest) (van Borkulo et al., 2022) were applied for PSSS symptom network analyses.

The PSSS, PSS, and PFS scores were continuous variables and expressed the means and standard deviations. The socio-demographic data were categorical variables and represented the number and percentage (%). The Kruskal-Wallis test and Wilcoxon rank sum test with Bonferroni correction was used to assess the associations between socio-demographic variables (such as risk level) and PSSS score. Chi-square tests were used to analyze the incidence rate of psychosomatic problems among the three waves.

Network analysis explored the psychosomatic symptom networks of PSSS in the three waves. All items of PSSS were designed as four-level scoring, and a parsimonious network of partial correlation coefficients based on these items were established through least absolute shrinkage and selection operator (LASSO) technique and the Extended Bayesian Information Criterion (EBIC). The accuracy of estimated networks were evaluated by bootraping 2500 times with 95 % confidence intervals.

The stability of the two factors structure of the Chinese version PFS was calculated by confirmatory factor analysis (CFA) through Mplus software (version 8.3; Muthen and Muthen, 2007). The reliability of PFS was assessed by Cronbach α which evaluated the internal consistency of each item. Spearman correlation was used find the relationship between the PSSS and PFS. All tests were considered as significant levels with $P < 0.05$ (2-tailed).

3. Results

3.1. Demographic characteristics

A total of 7585 participants completed the survey (4317 in the first wave, 1096 in the second wave, 2172 in the third wave). Of them, majority of investigators were female (5489, 72 %), age of 31–40 (2438, 32 %), mild-stage (4060, 53 %), good health status, (5747, 76 %), married (5647, 74 %), physician (4441, 59 %), college (5459, 72 %) and eastern regions (5053, 67 %) (Table 1).

3.2. Development of psychosomatic problems over time

We explored the development of psychosomatic problems by PSSS and PSS, and the severity increased significantly over time (Fig. 2). The prevalence of severe psychosomatic problems defined by the cut-off score of PSSS was 22 %, 28 %, and 39 % ($\chi^2(2) = 209.7$, $P < 0.001$, Cramer's V = 0.166) in the first, second, and third waves. In addition, the mean scores of the PSSS ($H(2) = 85.6$, $P < 0.001$) and PSS ($H(2) = 238.72$, $P < 0.001$) scale showed significant differences among the three waves, which exhibited the highest in the third wave and lowest in the first wave (Fig. 3). After the post hoc analysis, the PSS also showed a statistical difference between each of the three waves (all $P < 0.01$).

There were significant differences among different stages of populations of the PSSS total and factor scores in the three waves ($H(2) = 7.148$, $P = 0.028$). However, the difference was not confirmed by post hoc through Willcoxon test and Bonferroni correction (all $P > 0.05$). The score of the PSSS scale was significant difference in peoples with different marital status and health status (all $P < 0.001$) (supplementary materials Fig. S1). The populations with psychological diseases and divorced people were more likely to suffer from psychosomatic problems.

3.3. The network attributes of PSSS symptom in different waves

Comparisons of three waves networks based on network comparison test results showed a significant difference in global strength ($s = 0.54$, $P = 0.007$) (Fig. 4), but not network structure (all $P > 0.05$ in each of the comparisons between three wave). The tests indicated that the *edges*, which were partial correlations between networks' nodes, remained unchanged as the pandemic progressed. Compared with the first wave, the stronger edges between nodes were dryness of mouth and sleep difficulty, repeated thoughts or actions and pain in the third wave. In

Table 1
General information of the populations.

Variables		Total sample (N = 7585)		Wave1 (N = 4317)		Wave2 (N = 1096)		Wave3 (N = 2172)	
		n	%	n	%	n	%	n	%
Gender	Female	5489	0.72	3201	0.74	754	0.69	1534	0.71
	Male	2096	0.28	1116	0.26	342	0.31	638	0.29
Age	<18	16	0.00	1	0.00	3	0.00	12	0.01
	18–25	785	0.10	335	0.08	73	0.07	377	0.17
	26–30	1221	0.16	785	0.18	148	0.14	288	0.13
	31–40	2438	0.32	1479	0.34	328	0.30	631	0.29
	41–50	1876	0.25	1110	0.26	331	0.30	435	0.20
	51–60	990	0.13	502	0.12	155	0.14	333	0.15
	>60	259	0.03	105	0.02	58	0.05	96	0.04
Marital status	Single	1621	0.21	848	0.20	129	0.12	644	0.30
	Married	5647	0.74	3282	0.76	912	0.83	1453	0.67
	Divorced/widow	317	0.04	187	0.04	55	0.05	75	0.03
Education	Primary	37	0.00	21	0.00	6	0.01	10	0.00
	Middle/high	592	0.08	344	0.08	105	0.10	143	0.07
	College	5459	0.72	3089	0.72	762	0.70	1608	0.74
	Graduate	1497	0.20	863	0.20	223	0.20	411	0.19
Occupation	Physician	4441	0.59	2641	0.61	634	0.58	1166	0.54
	Teacher	500	0.06	227	0.05	77	0.07	196	0.09
	Small business owners	213	0.03	126	0.03	29	0.03	58	0.03
	Farmers	65	0.01	39	0.01	9	0.01	17	0.01
	Office workers	1301	0.17	760	0.18	204	0.18	337	0.15
	Others	1065	0.14	524	0.12	143	0.13	398	0.18
Regions	Eastern	5053	0.67	2842	0.66	790	0.72	1421	0.65
	Western	858	0.11	473	0.11	221	0.20	164	0.08
	Central	1674	0.22	1002	0.23	85	0.08	587	0.27
Health status	Healthy	5747	0.76	3387	0.78	828	0.76	1532	0.71
	Psychiatric	281	0.04	134	0.03	46	0.04	101	0.05
	Somatic	1557	0.21	796	0.18	222	0.20	539	0.25
Stage	Mild	4060	0.53	2616	0.61	446	0.41	851	0.39
	Moderate	701	0.09	507	0.12	19	0.02	171	0.08
	Severe	2953	0.38	1194	0.28	631	0.58	1150	0.53

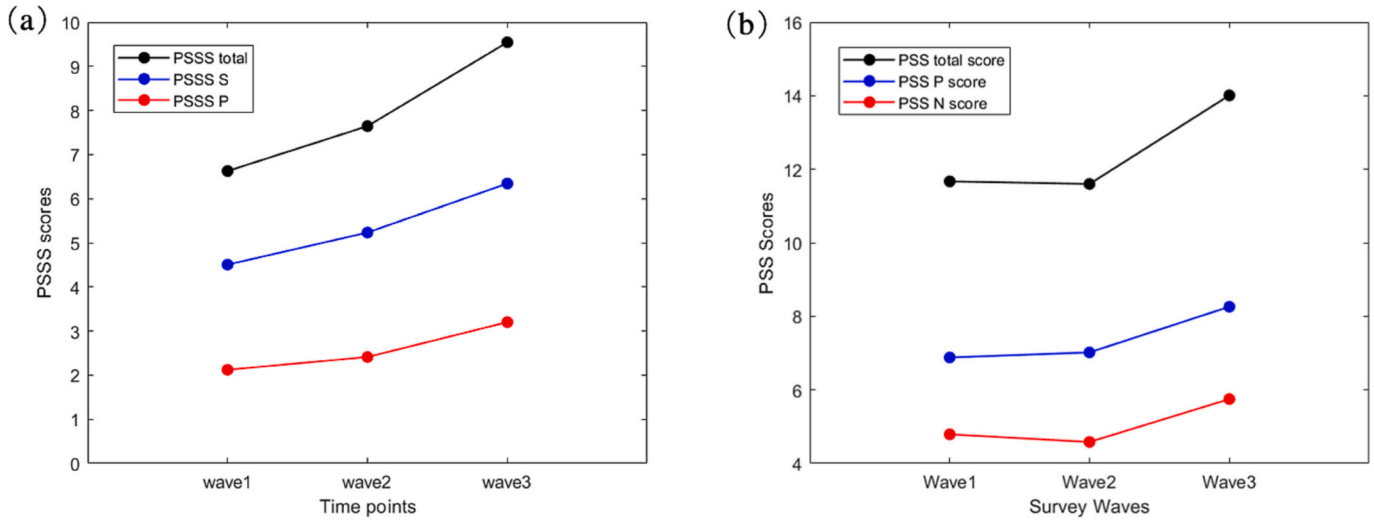

Fig. 2. Line diagram of psychosomatic problems in three waves dynamic changes of investigation. The mean scores of the PSSS and PSS scale showed significant differences among the three waves using Kruskal-Wallis test. PSSS: psychosomatic symptom scale. PSS: perceived stress scale.

both three networks, the strongest edges between nodes were depressed mood and no interest, dizziness and eye discomfort as well as sour regurgitation and nausea or vomiting.

As shown in Fig. 5, centrality indices of all nodes as measured in the three waves. Strength centrality data suggested that depressed mood was the strongest psychological symptom and tiredness was the strongest somatic symptom of PSSS in the first and third wave. While depressed mood was the strongest psychological symptom and feeling heat or cold was the strongest somatic symptom of PSSS in the second wave. The results of case-dropping subset bootstrapping indicated the strength remained stable under various analysis conditions. Correlation stability coefficient for strength was 0.75, 0.672, 0.75 in the first, second and third waves respectively (Fig. 6).

3.4. Self-reported COVID-19 life impact and pandemic fatigue

Firstly, we tested the reliability and validity of PFS scale in Chinese version. The CFA model showed adequate fit with minorly inflated RMSEA (TLI = 0.984, CFI = 0.991, RMSEA = 0.089, SRMR = 0.017). The internal consistency of PFS was acceptable (Cronbach's α = 0.831) (supplementary materials).

66 % of the survey population believed that the indirect COVID-19

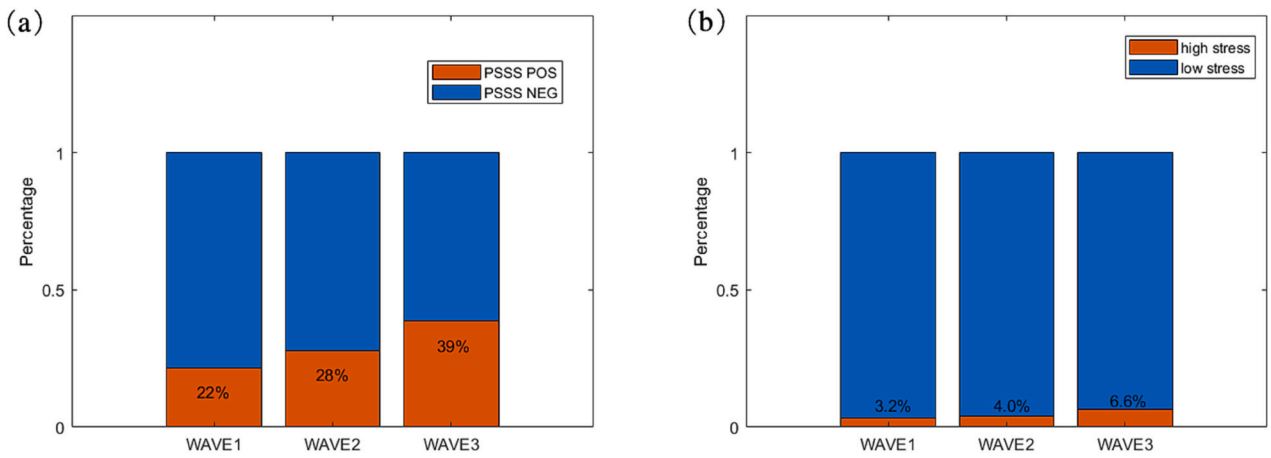

Fig. 3. Histogram of the incidence rate of psychosomatic problems. PSSS POS: people with PSSS score greater than cut-off value. PSSS NEG: people with PSSS score lower than cut-off value.

impact, such as following pandemic regulations, guidelines, and lockdowns, more severely affected their lives. The PFS score was also significantly higher in the people concerned about indirect impact than those worried about the direct threat from the COVID-19 ($P < 0.001$). More than 60 % believed that the pandemic impacted their lives most through economic issues, and the second is health service deficits. In addition, the people whose family relations were most affected by COVID-19 reported the highest PFS score [$H(4) = 32.27, P < 0.001$]. PFS positively correlated with PSSS ($R = 0.41$, $P < 0.001$) and PSS scores ($R = 0.35$, $P < 0.001$).

4. Discussion

The present study has shown that the prevalence of psychosomatic problems has been consistently growing during the different periods of the COVID-19 pandemic. Psychosomatic symptom networks with cross-validation showed that depressed mood and tiredness emerged as the most prominent central symptoms during different stages of the COVID-19 outbreak. With the development of the pandemic situation, people have different degrees of pandemic fatigue. Among the various effects of the pandemic, the family relationship is the most critical factor affecting pandemic fatigue. Pandemic fatigue also affects the occurrence of psychosomatic symptoms and perceived stress.

A pandemic is a particular type of disaster usually accompanied by social discrimination and immense psychological pressure (Sim, 2016). Our study provided evidence that the mean prevalence of psychosomatic problems was 29.7 %, mainly including depressed mood and tiredness during the different periods with the influence of COVID-19. Healthcare workers with psychosomatic symptoms exhibited higher perceived stress, more severe anxiety, and depressed mood and correlation between PSSS and PHQ-9 on the pandemic frontline was found in our previous study ($r = 0.822$) (Wang et al., 2023). Moreover, the mean PSSS score of the third wave respondents was significantly higher than the first and second wave respondents. It shows that psychosomatic problems cannot be ignored after the peak of the pandemic, even as in the normalization of the COVID-19 pandemic. COVID-19 pneumonia was not simply an infection but a disastrous experience for the patients, medical workers, disease control personnel, managerial personnel, and the general population. Lai's research found that the most typical disorders were depression (50.4 %), anxiety (44.6 %), insomnia (34.0 %), and distress (71.5 %) among health care workers (Lai et al., 2020). One month longitudinal study on the general population's mental health demonstrated that there were no significant longitudinal changes in stress, anxiety, and depression levels (Wang et al., 2020a). Some studies show that overall mental health status (11.2 %) and sleep problems (16.8 %) appeared to improve in the late stage of the outbreak in frontline healthcare (Zhou et al., 2021). The present results were similar to another acute respiratory syndrome outbreak (SARS) in 2003. The studies study showed that many SARS survivors had depression, anxiety, and post-traumatic symptoms. Moreover, the psychological impact of SARS may change over time. The immediate and short-term follow-up psychological sequelae of SARS have been reported as poor sleep, depressed mood, and nightmares (Cheng et al., 2004; Chua et al., 2004). SARS survivors showed a high level of the above symptoms with an alarming proportion (64 %) of psychiatric morbidity after one year (Lee et al., 2007). Some researchers were interested in examining the patterns of physical and psychiatric morbidities, which had remained clinically significant in Chinese survivors when the 10th anniversary of SARS (Xiang et al., 2014). We should emphasize the importance of assessment and management for the whole population, including healthcare workers and survivors, even in the post pandemic period.

The depressed mood is the central symptom among the general population during the COVID-19 pandemic, consisting to previous studies (Belvederi Murri et al., 2020; Hoffart et al., 2021). The depressed mood is a core characteristic of depression that refers to a cluster of negative mood experiences such as sadness, crying spells, and loneliness. The population could not pursue many routine activities outside of the home, such as daily work, social communications, and entertainment, due to the COVID-19 pandemic, which increased the likelihood of depression. Such evidence may help to account for depressed mood as the most prominent symptom among psychological symptoms across three waves. Tiredness is another central node in psychosomatic networks, consistent with the finding that fatigue was the most common symptoms post COVID-19 (Aiyegbusi et al., 2021; Huang et al., 2021). A meta-analysis also revealed that a significant proportion of individuals experience persistent fatigue following the resolution of COVID-19 (Ceban et al., 2022). Some suggest that fatigue and cognitive impairment, along with other enduring neuropsychiatric (e.g., depression) and physical manifestations, comprise "post-acute sequelae of SARS-CoV-2". In contrast, fatigue and cognitive impairment have been consistently reported as some of the most common and debilitating features of "post-COVID-19 syndrome" (Nalbandian et al., 2021). These symptoms may be caused by direct viral encephalitis, neuro-inflammation, hypoxia, and cerebrovascular disease (Ceban et al., 2022).

Participants with psychiatric disorders and divorced had a high prevalence of psychosomatic problems. General health status is an essential protective factor influencing psychosomatic conditions. The participants with the psychiatric disorders had worse resilience and were more sensitive to stress (Troisi, 2020). Epidemiological research found that death caused by COVID-19 was comorbidity with physical diseases. Marital status is also an important factor impact the PSSS. Divorced participants may have higher psychosomatic problems due to

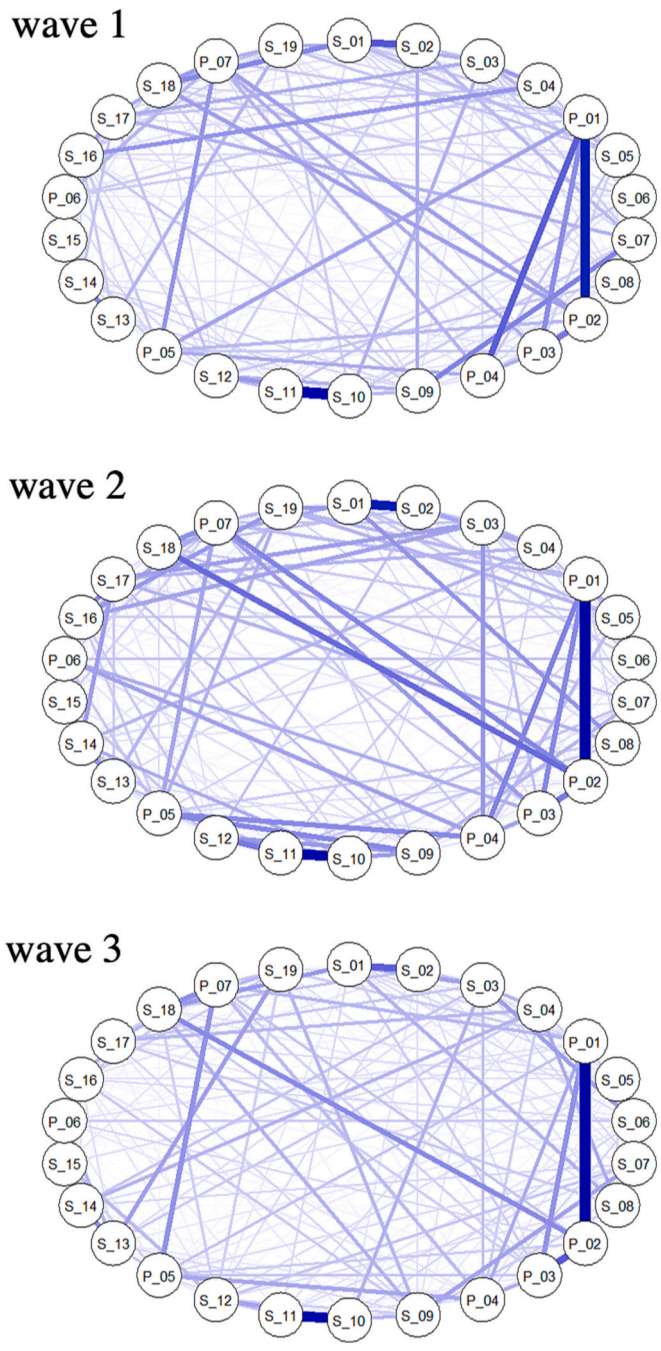

Fig. 4. The network structure of PSSS symptoms in three waves.

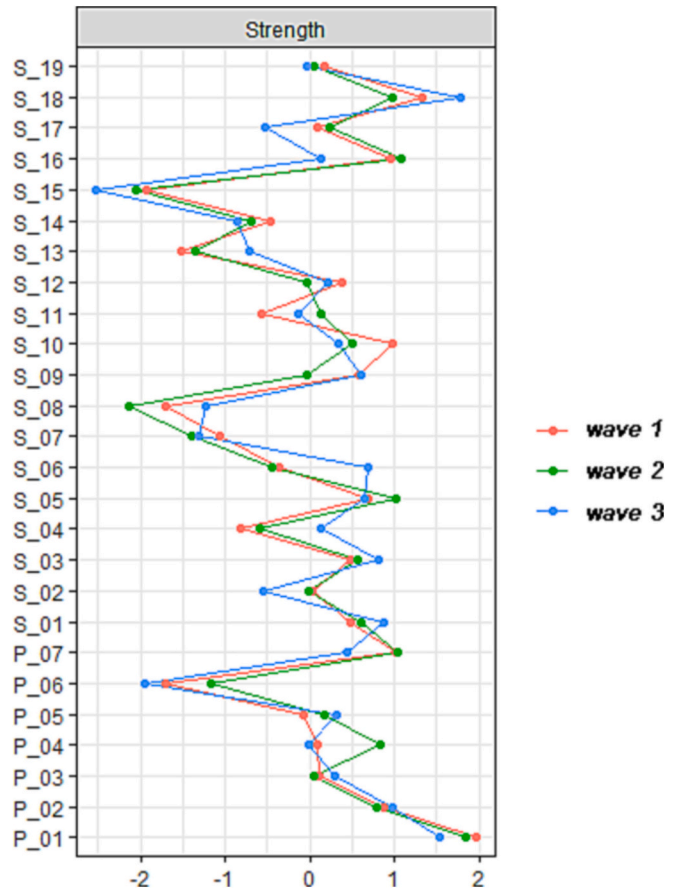

Fig. 5. Centrality measures of psychosomatic symptoms within the network at different stages of the COVID-19 pandemic.

lack of family support. The present study did not find that high-risk people have more serious psychosomatic problems. In general, the psychosomatic status of health care workers was high-risk during the pandemic. However, our study found that the incidence of psychosomatic problems among health care workers did not increase significantly with the pandemic's progress. It may be related to a good understanding of the disease and timely establishment of ways to mitigate mental health risks and adjust interventions under pandemic conditions for medical staff.

In the present study, populations with the indirect influence of COVID-19 have high pandemic fatigue, most affected by family relationships. Governments and health authorities have recommended various health-protective behaviors, such as mask-wearing, quarantines, and physical distancing, to curb the spread of the COVID-19 (Flaxman et al., 2020; Hsiang et al., 2020; Kraemer et al., 2020). These regulations caused extra burden and stress to the whole society (Bonaccorsi et al., 2020; Witteveen and Velthorst, 2020), and they ultimately rely on people's continued willingness to follow guidelines. However, implementing these restrictions, especially during the long-term pandemic, people will have pandemic fatigue. The emergence of pandemic fatigue will reduce people's pandemic prevention behavior and bring more psychological problem (Labrague, 2021; Petherick et al., 2021). This study found that family relationship is the most critical factor affecting pandemic fatigue among the various effects of the pandemic. Pandemic fatigue is also positively related to the occurrence of psychosomatic symptoms. It is consistent with the previous study that manifestations of pandemic fatigue include sleep problems, hopelessness, sadness, loneliness, increased worry, and irritability (Labrague and Ballad, 2021; Majumdar et al., 2020).

Understanding the mental health response could help communities and medical workers prepare for a population's response to a catastrophic public health emergency. On Jan 27, 2020, the National Health Commission of China promptly published a national guideline for psychological crisis intervention and gradually psychological assistance hotline (National Health Commission of the People's Republic of China website). These publications marked the guidance to provide multifaceted psychological protection of mental health has been initiated in China. Social organizations such as the CSPM have recruited psychological and psychiatric experts working in crisis intervention through giving lectures, questionnaires, hotlines, and face-to-face psychological counseling. CSPM proposed psychosomatic health services intervention programs, and it suggested that people adjust to mild psychosomatic problems. We should pay close attention to those with psychosomatic problems.

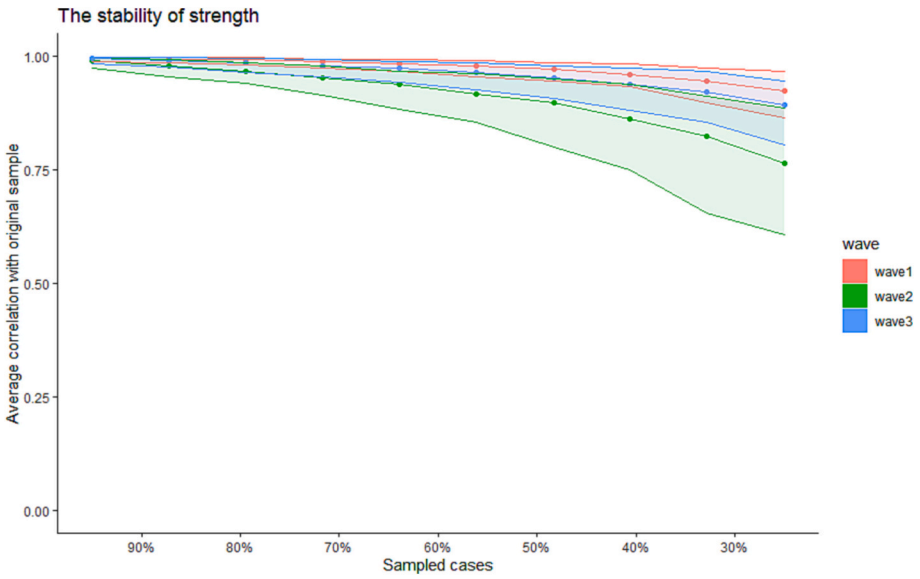

Fig. 6. Stability of centrality indices by case dropping subset bootstrap. Each line indicates the correlations of strength in different wave, while solid lines without dotted of the same color indicate 95 % CI.

4.1. Limitations

Our study has some limitations. Firstly, this study had different sample sizes in three waves. Secondly, there is a considerable bias towards gender and jobs. The majority of samples are female, and their jobs are health-related professions. Thirdly, the detailed analysis of fatigue could be further studied in the further.

4.2. Implications

In summary, COVID-19 elicits a rapid spread and brings huge psychosomatic problems. Moreover, the general incidence rate of psychosomatic problems has been consistently growing during the different periods of COVID-19 pneumonia. With the development of the pandemic situation, people have different degrees of pandemic fatigue. Family relationship is the most critical factor affecting pandemic fatigue. Pandemic fatigue also affects the occurrence of psychosomatic symptoms and perceived stress, which alert psychotherapy was the pivotal handle of the present crisis intervention.

CRediT authorship contribution statement

YG Yuan, YY Yue and WH Jiang designed the study. L Li, SY Zhang, H Sang, MQ Tang, T Zou, Y Sun, J Chen, AQ Wu and XH Shen collected the data. WH Jiang, R Liu, L Li, YQ Zhang and YY Yue analyzed data. YY Yue, R Liu and L Li wrote the manuscript. YG Yuan, WH Jiang and SM Shah revised the report.

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Conflict of interest

None of the authors have any conflicts of interest to declare.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jad.2023.03.032.

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